Categories of Tissues

- Epithelium
- Connective
- Muscle
- Nervous
Epithelium

- Lines, covers, and protects other tissues and organs.

- Characterized by:
  - Cells tightly **junked together**
  - The presence of a cell secretion called the **basement membrane**.

- Named by:
  - **Cell shape**
  - Other characteristics of the cells.

- **Squamous**, **Cuboidal**, and **Columnar**
Squamous Epithelium

- Cells very thin, much wider than they are thick.
  - **Simple Squamous Epithelium**
    - Air sacs of respiratory
    - Lining of blood vessels, heart and lymphatic tubes
  - **Stratified Squamous Epithelium**
    - Skin
    - Vagina
    - Esophagus
    - Mouth
Examples of Simple Squamous Epithelium

- Single layer of cells
- Basement membrane
- Cell layer of Simple Squamous Epithelium
Categories of Tissues

Stratified Squamous Epithelium
Cuboidal Epithelium

- Cells cube shaped- secretion and absorption.
  - Kidney tubules
  - Duct and small glands
  - Surface of ovary
Columnar Epithelium

- Elongated cells, much longer than they are wide.

  - **Simple Columnar Epithelium**
    - A single layer of cells that line the digestive tract, gallbladder and excretory ducts of some glands. Has microvilli at surface for absorption.

  - **Pseudostratified ciliated columnar epithelium**
    - Lines the bronchi, trachea, uterine tubes and some of the uterus. Propels mucus or reproductive cells by ciliary action.
Simple Columnar epithelium
Pseudostratified Ciliated Columnar Epithelium
Connective Tissue

- Characterized by the cells widely separated from each other in a matrix that is produced by the cells.
- Tissue protects and supports.
- Cell Matrix composed of two regions
  - Ground
    - Liquid (sol), Gel, Gum or solid
  - Fibers
    - Non-elastic (= white or Collagen)
    - Elastic (= yellow fibers)
- Types of Connective tissue

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Types of Connective Tissue

- Loose (Areolar) Connective Tissue
- Dense Connective Tissue
- Adipose
- Cartilage
- Bone
- Blood
Loose Connective Tissue (Areolar)

- Gel like ground with both elastic and non-elastic fibers running though the ground in many directions.
  - Wraps and cushions organs
  - Under the skin
Dense Regular Connective Tissue

- Nuclei and fibers arranged in parallel rows.
  - Tendons and ligaments
  - Fibers mostly non-elastic
**Adipose (Fat)**

- Function as *storage cells for adipose (lipids)*
- Adipose cells contain a **large vacuole** which in the live cell contains lipids.
- Cell **nucleus and cytoplasm are pushed out to edge of cell membrane**.
Cartilage

- Ground of matrix is gum like.
- Cells are found in Lacunae within the matrix.
- Fibers may be elastic or non-elastic, or a form of non-elastic called reticular (where the non-elastic fibers of very thin)
  - **Hyaline Cartilage** - example on the ends of bones
  - **Elastic Cartilage** - example ear cartilage
  - **Non-elastic Cartilage** - example nose cartilage.
Hyaline cartilage
Elastic Cartilage
Bone

- Ground of matrix is Solid (Calcium carbonate).
- Has blood supply and nerves running through the Haversian canal systems.
Vascular Tissue (Blood)

- Liquid matrix = plasma
  - 90% water
  - 10% Plasma proteins, electrolytes, hormones, oxygen, glucose etc.

- Formed elements
  - **Erythrocytes** - 48 billion (female) to 54 billion (male) cell / ml of blood in humans. Mammals are enucleated while rest of the vertebrates they have nuclei
  - **Leukocytes** - about 7.5 million / ml of blood
  - **Platelets** - blood clotting
Blood

- Erythrocytes
- Leukocyte
- Platelets
Muscle Tissue

- Tissue with cells having fibers specialized for contraction.

  - **Skeletal Muscle** (Striated, voluntary)
    - Parallel elongated cells (fibers)
    - Multinucleated and each cell is the length of the muscle.
    - Light meat, Dark meat—Slow twitch, fast twitch muscle

  - **Smooth Muscle** (Visceral, involuntary)
    - Cells are long and tapered.
    - Organized into sheets of muscle.

  - **Cardiac Muscle**
    - Intercalated disc
    - Myogenic
    - Branched
Skeletal Muscle
Smooth Muscle
Cardiac Muscle

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Nervous Tissue

- Cells specialized to polarize and depolarize.
- Cell is a neuron
End of Tissue presentation